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CHICAGO
LOS ANGELES
NEW YORK
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717 NORTH HARWOOD
DALLAS, TEXAS 75201
TELEPHONE 214 981 3300
FACSIMILE 214 981 3400

HONG KONG
LONDON
SHANGHAI
SINGAPORE
TOKYO

FOUNDED 1866

WRITER'S DIRECT NUMBER
(214) 981-3328

WRITER'S E-MAIL ADDRESS
pplap@sidley.com



August 3, 2000

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Derrick T. Gordon

Name of Person Mailing Paper or Fee

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Date of Signature

Re: New U.S. Patent Application
DATA COMMUNICATION APPARATUS AND METHOD OF DATA
COMMUNICATION
By: Kenichi MORITA, Keisuke HASHIMOTO, and Kenichi
TAKAHASHI
Attorney Docket: 15162/02390

Dear Sir:

Enclosed for filing are the following papers relating to
DATA COMMUNICATION APPARATUS AND METHOD OF DATA COMMUNICATION,
Kenichi MORITA, Keisuke HASHIMOTO, and Kenichi TAKAHASHI,
inventors:

- (1) Specification;
- (2) Executed Declaration and Power of Attorney;
- (3) Formal Drawings (11 sheets);

Assistant Director For Patents

August 3, 2000

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- (4) Certified Copy of the Priority Document;
- (5) Information Disclosure Statement, PTO-1449 Form and copy of cited reference;
- (6) Transmittal of PrintEFS Patent Application Bibliographic Data;
- (7) Assignment of the invention to MINOLTA CO., LTD., with attached Recordation Form Cover Sheet;
- (8) Check in the amount of \$40.00 to cover the fee for recordal of the Assignment; and
- (9) Check in the amount of \$768.00 to cover the filing fee of the application.

In the event the attached checks in the amounts of \$40.00 and \$768.00 are not received with this correspondence, are not sufficient, or in the event additional fees are due, please charge the required fees during the pendency of this application (other than issue fee) to Sidley & Austin's Deposit Account No. 18-1260. Please credit any overpayment to Sidley & Austin's Deposit Account No. 18-1260.

All correspondence is to be directed to the Applicants' attorney at the Dallas address listed above.

Respectfully submitted,

By: James W. Williams
James W. Williams
Registration No. 20,047
Attorney for Applicants

JWW/mhg
Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re

U.S. application of: Kenichi MORITA, Keisuke HASHIMOTO,
and Kenichi TAKAHASHI

For: DATA COMMUNICATION APPARATUS AND
METHOD OF DATA COMMUNICATION

U.S. Serial No.: To Be Assigned

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BOX PATENT APPLICATION

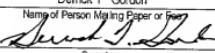
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Derrick T. Gordon
Name of Person Mailing Paper or Fee

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August 3, 2000
Date of Signature

TRANSMITTAL OF PrintEFS PATENT APPLICATION

BIBLIOGRAPHIC DATA

Submitted herewith is bibliographic data (2 pages) for
the above-identified application, in the PrintEFS Version
1.0.1 program format.

Respectfully submitted,

James W. Williams
James W. Williams
Registration No. 20,047
Attorney for Applicants

JWW/mhg

SIDLEY & AUSTIN
717 North Harwood
Suite 3400
Dallas, Texas 75201-6507
(214) 981-3328 (direct)
(214) 981-3300 (main)

August 3, 2000

INVENTOR INFORMATION

Inventor One Given Name:: Kenichi
Family Name:: MORITA
Postal Address Line One:: Minolta Co., Ltd., Osaka Kokusai Bldg.
Postal Address Line Two:: 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku
City:: Osaka-Shi
State or Province:: Osaka
Country:: JAPAN
Postal or Zip Code:: 541-8556
City of Residence:: Toyohashi-Shi
State or Province of Residence:: Aichi-Ken
Country of Residence:: JAPAN
Citizenship Country:: JAPAN
Inventor Two Given Name:: Keisuke
Family Name:: HASHIMOTO
Postal Address Line One:: Minolta Co., Ltd., Osaka Kokusai Bldg.,
Postal Address Line Two:: 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku
City:: Osaka-Shi
State or Province:: Osaka
Country:: JAPAN
Postal or Zip Code:: 541-8556
City of Residence:: Toyokawa-Shi
State or Province of Residence:: Aichi-Ken
Country of Residence:: JAPAN
Citizenship Country:: JAPAN
Inventor Three Given Name:: Kenichi
Family Name:: TAKAHASHI
Postal Address Line One:: Minolta Co., Ltd., Osaka Kokusai Bldg.,
Postal Address Line Two:: 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku
City:: Osaka-Shi
State or Province:: Osaka
Country:: JAPAN
Postal or Zip Code:: 541-8556
City of Residence:: Toyohashi-Shi
State or Province of Residence:: Aichi-Ken
Country of Residence:: JAPAN
Citizenship Country:: JAPAN

CORRESPONDENCE INFORMATION

Name Line One:: Sidley & Austin
Name Line Two:: James W. Williams
Address Line One:: 717 N. Harwood
Address Line Two:: Suite 3400
City:: Dallas
State or Province:: Texas
Country:: USA
Postal or Zip Code:: 75201-6507

Telephone One:: 214-981-3328
Fax One:: 214-981-3400
Electronic Mail One:: pplap@sidley.com
Telephone Two:: 214-981-3300
Electronic Mail Two:: jwilli09@sidley.com

APPLICATION INFORMATION

Title Line One:: DATA COMMUNICATION APPARATUS AND METHOD
Title Line Two:: OF DATA COMMUNICATION
Total Drawing Sheets:: 11
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Registration Number Seven:: 38595
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Registration Number Nine:: 38425

PRIOR FOREIGN APPLICATIONS

Foreign Application One:: 11-223622
Filing Date:: 08-06-1999
Country:: JAPAN
Priority Claimed:: Yes

Source:: PrintEFS Version 1.0.1

DATA COMMUNICATION APPARATUS
AND METHOD OF DATA COMMUNICATION

This application is based on Patent Application
5 No. 11-223622 filed in Japan, the content of which is
hereby incorporated by reference.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to a data communication apparatus and method of data communication, and specifically relates to a data communication apparatus and data communication method capable of transmitting data over a plurality of communication lines such as internet line and the like in addition to a telephone line.

DESCRIPTION OF THE RELATED ART

In conventional data communication apparatuses such as facsimile apparatuses and the like, communicant destinations (transmission destinations) and their address data are recorded in memory beforehand. Then, according to the known art, during actual transmission, the data transmission is executed to the address

destination recorded in memory only for the specified transmission destination.

In such data communication apparatuses capable of recording communicant information, however, the address data of communicant destinations must be recorded by manual input one at a time, and this recording operation is a major burden for the operator.

Accordingly, in order to reduce the labor of the operator required for the recording operation, Japanese Laid-Open Patent Application No. 10-98604, for example, discloses art allowing automated recording by transmitting the information of recorded transmission destinations to another data communication apparatus.

In the art disclosed in Japanese Laid-Open Patent No. 10-98604, however, information of a transmission destination recorded in memory of a specific data communication apparatus is simply transmitted to a single other data communication apparatus. For this reason, the transmitted information may be communicant destination information that is unnecessary to the other data communication apparatus, and the necessary communicant destination information may be omitted. In such instances, it becomes necessary to perform an operation to correct (add or delete) the new communicant destination information.

Particularly in recent years the upgrading of
the communication infrastructure has led to the
popularization of data communication apparatuses capable
of using not only public telephone lines, but also a
5 plurality of lines including internet lines and LAN lines
and the like. A representative data communication
apparatus is, for example, the internet facsimile
apparatus. In such data communication apparatuses, the
correction operation required after the transmission of
the communication destination information has become
remarkably problematic, greatly increasing the burden on
the operator.

That is, in data communication apparatuses
capable of using a plurality of lines, the data
communication apparatus itself will have a plurality of
addresses corresponding to the plurality of lines. For
this reason, a plurality of address data for a single
communicant destination (transmission destination) must
be recorded together in memory.

20 Accordingly, the amount of communicant
destination data recorded in memory greatly increases
compared to when data of a single address are recorded.
Similarly, the operation of recording communicant address
data one at a time performed by the operator is markedly
25 increased.

SUMMARY OF THE INVENTION

An object of the present invention is to
eliminate the previously described disadvantages by
5 providing a data communication apparatus and method of
data communication capable of reducing the recording
operation for communicant address data.

In order to attain said objects, the data
communication apparatus of present invention has a
specification unit for specifying a transmission
destination; and a transmission unit for transmitting a
plurality of its own address data corresponding to each
of the plurality of communication lines to the specified
transmission destination.

In order to attain said objects, the another
data communication apparatus of present invention has a
receiving unit for receiving at least one of address data
of another data communication apparatus; a recording unit
for recording the address data received by the receiving
20 unit; and a transmission unit for transmitting at least
one of its own address data to the address recorded by
the recording unit.

In the following description, like parts are
designated by like reference numbers throughout the
25 several drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exterior view of a data communication apparatus 1 of an embodiment of the present invention;

FIG. 2 shows an example of a data communication system construction wherein a data communication apparatus 1 is mutually connected to an analogous apparatus;

FIG. 3 is a block chart briefly showing the overall structure of the data communication apparatus 1 of an embodiment of the present invention;

FIG. 4 is a flow chart showing the processing flow when the data communication apparatus 1 transmits data;

FIG. 5 is a flow chart showing the processing flow when the data communication apparatus 1 receives data;

FIG. 6 illustrates the initial data transmission using a public telephone line from a data communication apparatus 1 to a data communication apparatus 2 in the data communication system shown in FIG. 2;

FIG. 7 shows an example of recording of the address memory 311 in each data communication apparatus when the initial data transmission of FIG. 6 ends;

5 FIG. 8 shows the second and subsequent transmission processes after the end of the initial data transmission of FIGS. 6 and 7;

FIG. 9 illustrates a change of the address of one of the data communication apparatuses;

10 FIG. 10 shows a recording example of the address memory 311 in a data communication apparatus 1 when data transmission from one to another apparatus ends;

15 FIG. 11 shows another example when the address of the data communication apparatus 2 has changed; and

FIG. 12 illustrates a change of the address data of the data communication apparatus 2 stored in the address memory 311 in the data communication apparatus 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 A first embodiment of the present invention is described hereinafter with reference to the accompanying drawings. FIG. 1 shows an exterior view of a data communication apparatus 1 of an embodiment of the present invention. A document feed tray 101 supplies document images for transmission. A document discharge tray 103

5 ejects the read document image. A recording sheet feed tray 107 supplies recording sheets to printout the reception data. A recording sheet discharge tray 105 ejects the printed recording sheets. An operation panel 109 operates the data communication apparatus 1.

FIG. 2 shows an example of a data communication system construction wherein a data communication apparatus 1 is mutually connected to an analogous apparatus. To facilitate the description, the data communication apparatus (FAX1) on the left side is referred to as [data communication apparatus 1], and the data communication apparatus (FAX2) on the right side is referred to as [data communication apparatus 2] (similarly, in FIGS. 6 to 12 hereafter).

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Referring to FIG. 2, the data communication apparatus 1 and the data communication apparatus 2 are connected over a public telephone line and internet line via LAN (hereinafter referred to as LAN + internet line). Accordingly, each data communication apparatus has its own telephone number (FAX number), and internet address (hereinafter both are referred to as "addresses").

In FIG. 2, the telephone number of the data communication apparatus 1 is "XXX-XXX-AAAA", and the internet address is "fax1.foo.xx.zzz", and the telephone

number of the data communication apparatus 2 is "XXX-XXX-BBBB", and the internet address is "fax2.bar.yy.aaa".

FIG. 3 is a block diagram briefly showing the overall construction of the data communication apparatus of the embodiment of the present invention. A central processing unit 313 controls the entire apparatus. The operation unit (operation panel) 109 specifies the transmission destination, and sets the various modes and the like. A reading unit 303 reads the document image at a specified resolution. A communication controller 307 transmits data read by the reading unit 303 to the data communication apparatus 2, and receives data transmitted from the data communication apparatus 2. The print unit 305 outputs data received by the communication controller 307 at a specified resolution. An address memory 311 stores the addresses (internet address, telephone number and the like) of the transmission destinations (communicant destination) recorded by a one-touch dial key or the like. A memory unit 309 is a work area for the central processing unit 313, and stores control programs and received data and the like.

In FIG. 3, the communication controller 307 is connected to a public telephone line and LAN + internet line, and selects a suitable line in accordance with the

situation, and transmits and receives data using the selected line.

The data communication apparatus 1 transmits image data together with its own plurality of address data (telephone number and internet address) when transmitting data to the data communication apparatus 2. Furthermore, when the data communication apparatus 1 receives a plurality of address data belonging to the data communication apparatus 2 together with image data transmitted from the data communication apparatus 2, the data communication apparatus 1 records the plurality of the addresses data of apparatus 2 in the address memory 311.

FIG. 4 shows a flow chart of the processing flow when the data communication apparatus 1 transmits data. Referring to FIG. 4, in step S401, the operator specifies a transmission destination from the operation unit 109. Then, in step S403, the address memory 311 is searched to obtain the communicant destination address corresponding to the specified transmission destination.

Next, in step S405, a determination is made as to whether or not a corresponding address exists in the address memory 311. If a corresponding address exists in the address memory 311, then in step S407 the image data are transmitted to the communicant destination address.

However, when a corresponding address does not exist in the address memory 311, the operator inputs the communicant destination address in step S411.

Then, in step S409, the plurality of address data (telephone number and internet address) of the apparatus 1 itself are transmitted to the same communicant destination as the transmission destination of the image data. Then, the transmission process ends.

FIG. 5 is a flow chart showing the processing flow when the data communication apparatus 1 receives data. Referring to FIG. 5, in step S501, a determination is made as to whether or not data have been transmitted from the data communication apparatus 2. Then, when data have been received, in step S503, the image data are received by the communication controller 307.

Then, in step S505, a plurality of address data (FAX number and internet address) are received from the sending side, i.e., the data communication apparatus 2. In step S507, the obtained address data of the data communication apparatus 2 are recorded in the address memory 311.

In step S509, the plurality of address data of the apparatus 1 itself are transmitted to the obtained address of the data communication apparatus 2, and the reception process ends.

The transmission process and the reception process are described specifically below with reference to FIGS. 6 to 10. FIG. 6 illustrates the initial data transmission using a public telephone line from the data communication apparatus 1 to the data communication apparatus 2 in the data communication system shown in FIG. 2.

As shown in FIG. 6, the sending side, i.e., data communication apparatus 1 transmits normal image data and the addresses of the data communication apparatus 1, i.e., a telephone number "XXX-XXX-AAAA" and internet address "fax1.foo.xx.zzz" to the data communication apparatus 2.

FIG. 7 shows an example of recording of the address memory 311 in each data communication apparatus when the initial data transmission of FIG. 6 ends. As shown in FIG. 7, when the initial data transmission ends, mutual address data are recorded in each address memory 311.

That is, the plurality of address data of the data communication apparatus 1 are recorded in the address memory 311 of the data communication apparatus 2 via the transmission process of the data communication apparatus 1. Then, the plurality of address data of the data communication apparatus 2 are recorded in the

address memory 311 of the data communication apparatus 1 via the transmission process of the data communication apparatus 1.

As a result, the identification information [FAX2] of the data communication apparatus 2 and the telephone number "XXX-XXX-BBBB" and internet address "fax2.bar.yy.aaa" associated with the identification information are recorded in the address memory 311 of the data communication apparatus 1. Furthermore, the identification information [FAX1] of the data communication apparatus 1 and the telephone number "XXX-XXX-AAAA" and internet address "fax1.foo.xx.zzz" associated with the identification information are recorded in the address memory 311 of the data communication apparatus 2.

As described above, at the moment the initial transmission ends from the data communication apparatus 1 to the data communication apparatus 2 using a public telephone line, a plurality of addresses of each apparatus are automatedly reciprocally recorded. Accordingly, the operation of manually recording addresses is deleted, thus greatly reducing the burden on each operator. In particular, since only the plurality of address data of the communicants on the sending and receiving sides are recorded, new correction processes

(addition and deletion of address data) are eliminated, and the operating environment prior to the recording is undisturbed.

FIG. 8 shows the second and subsequent transmission processes after the end of the initial data transmission of FIGS. 6 and 7. FIG. 8 illustrates the situation when data are transmitted from the data communication apparatus 2 to the data communication apparatus 1 over the internet line.

As shown in FIG. 8, the address memory 311 of the data communication apparatus 2 records an internet address as well as the telephone number for the data communication apparatus 1. For this reason, when the transmission destination is specified by apparatus name or telephone number by the operator of the data communication apparatus 2, a plurality of address data recorded in the address memory 311 are searched. Then, "FAX1:XXX-XXX-AAAA:fax1.foo.xx.zzz" is obtained as the search result.

A suitable address for this transmission, i.e., the internet address "fax1.foo.xx.zzz" is selected from the obtained search result. Then, data are transmitted to the selected address (from data communication apparatus 2 to the data communication apparatus 1) over the LAN and internet line.

During this data transmission, the respective plurality of addresses are again transmitted. For this reason, the content of the recording of the address memory 311 remains intact and unchanged insofar as there
5 is not change in the telephone number and internet address.

The situation when the address of one of the data communication apparatuses has changed is described below with reference to FIG. 9. In FIG. 9, consider that the plurality of addresses of the data communication apparatus 1 are all unchanged, whereas the telephone number of the data communication apparatus 2 has changed from "XXX-XXX-BBBB" to "XXX-XXX-CCCC".

In this case, at the moment the data transmission ends from either apparatus to the other, the old (pre-change) telephone number of the data communication apparatus 2 is changed and the new (post change) telephone number is recorded in the address memory 311 of the data communication apparatus 1.

Accordingly, when data are once transmitted, the changed address is recorded automatically even when the address has changed. Therefore, the address data recording operation required when the address is changed becomes unnecessary, and the labor of the operator is
25 greatly reduced.

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A second embodiment of the invention is described below. In the second embodiment the basic construction is identical to that of the data communication apparatus 1, but the reception process sequence is slightly different when the transmitted address has changed. FIG. 11 shows another example when the address of the data communication apparatus 2 has changed in the second embodiment. Specifically, when the telephone number of the data communication apparatus 2 has changed from "XXX-XXX-BBBB" to "XXX-XXX-CCCC".

In this case, when the data transmission ends from either apparatus to the other, the old previously recorded telephone number of the data communication apparatus 2, i.e., "XXX-XXX-BBBB", is present and unrevised in the address memory 311, and the new telephone number, i.e., "XXX-XXX-CCCC" is recorded.

20

This new telephone number is still in a prohibited state and cannot be used. Accordingly, the information [not permitted] is also recorded. Then, in this state, the new telephone number cannot be used because the operator has not permitted its use, and only the old telephone number can be used.

25

FIG. 12 illustrates a change of the address data of the data communication apparatus 2 stored in the address memory 311 in the data communication apparatus 1.

When the operator permits use of the changed telephone number of the data communication apparatus 2, the previously recorded old telephone number is deleted, and the information [not permitted] of the new telephone 5 number is also deleted. Accordingly, this is the first time the new telephone number can be used.

In the second embodiment described above, when address data have changed, the address data are not immediately changed to the new address data, and the revision does not occur until the operator grants permission. For this reason, the situation can be avoided whereby address data are erroneously revised by a prank data transmission or the like against the intention of the operator.

In the above embodiments, a plurality of address data of the apparatus itself are normally transmitted together with the normal image data transmission. However, a plurality of address data of the apparatus itself also may be transmitted, for example, 20 only when an address data transmission request is received from the communicant side. Furthermore, although the address data transmission and reception occurs after image data transmission and reception, the address data transmission and reception may be performed 25 before or during image data transmission and reception.

According to this invention, the data communication apparatus transmits a plurality of its own address data in addition to normal transmission of image data. Accordingly, new correction processing and the like is unnecessary at the transmission destination, thereby reducing the recording operation for address data at the communicant destination while maintaining a conventional operating environment.

Furthermore, according to this invention, the data communication apparatus records a plurality of address data of another data communication apparatus. Accordingly, new correction processing and the like by an operator is unnecessary, thereby reducing the recording operation for address data of the communicant destination while maintaining a conventional operating environment.

Although the present invention has been fully described by way of examples with reference to the accompanying drawings, it is to be noted that various changes and modification will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention, they should be construed as being included therein.

WHAT IS CLAIMED IS:

1. A data communication apparatus capable of connecting a plurality of communication lines, comprising:

5 a specification unit for specifying a transmission destination; and

a transmission unit for transmitting a plurality of its own address data corresponding to each of the plurality of communication lines to the specified transmission destination.

10 2. The data communication apparatus according to claim 1, wherein said transmission unit transmits the address data together with image data.

15 3. The data communication apparatus according to claim 1, further comprising:

a receiving unit for receiving at least one of address data of another data communication apparatus; and

20 a recording unit for recording the address data received by the receiving unit.

4. The data communication apparatus according to claim 3, further comprising a controller for controlling use of received address data.

5. A method of data communication comprising
the steps of:

specifying a transmission destination; and
transmitting a plurality of its own address
data corresponding to each of a plurality of
communication lines to the specified transmission
destination.

10 6. A data communication apparatus capable of
connecting a plurality of communication lines,
comprising:

a receiving unit for receiving at least one of
address data of another data communication apparatus;

15 a recording unit for recording the address data
received by the receiving unit; and

a transmission unit for transmitting at least
one of its own address data to the address recorded by
the recording unit.

20 7. The data communication apparatus according
to claim 6, wherein said own address data are
corresponding to each of the plurality of communication
lines.

8. The data communication apparatus according to claim 6, further comprising a controller for controlling use of recorded address data.

5 9. A method of data communication comprising the steps of:

receiving at least one of address data of another data communication apparatus;

recording the received address data; and

10 transmitting its own address data to the recorded address.

ABSTRACT OF THE DISCLOSURE

A data communication apparatus determines whether or not data are being transmitted, and receives the image data when data have been transmitted. Then, a plurality of address data of the sending side are obtained. Then, the obtained plurality of address data of the sending side are recorded in an address memory. Finally, the apparatus transmits its own plurality of address data to the obtained address of the sending side, and the reception process ends.

Fig.1

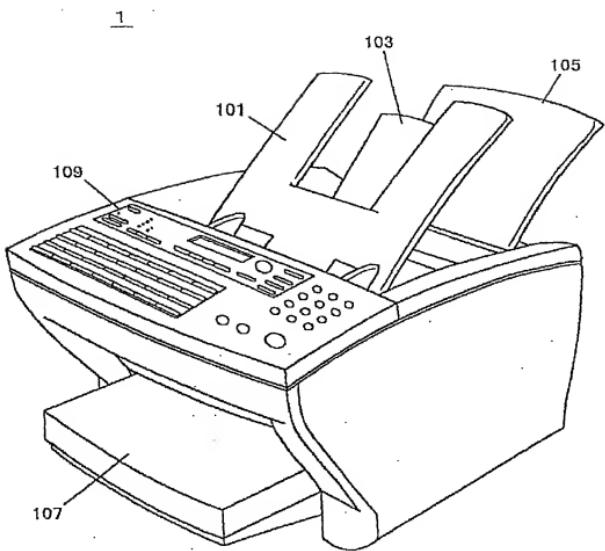


Fig.2

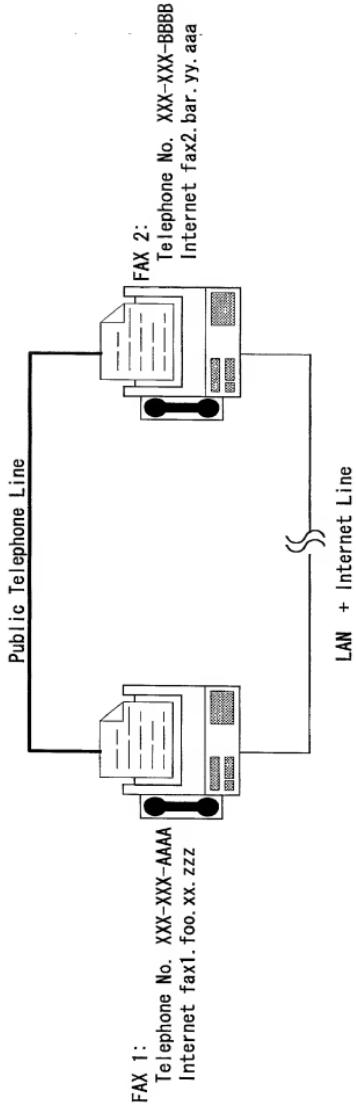


Fig.3

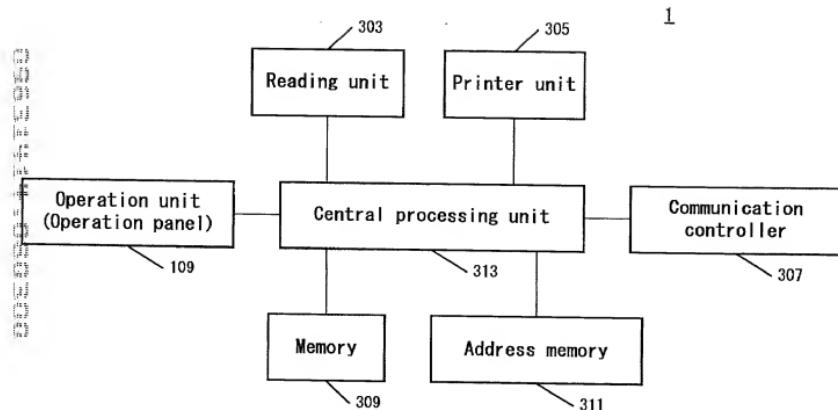


Fig.4

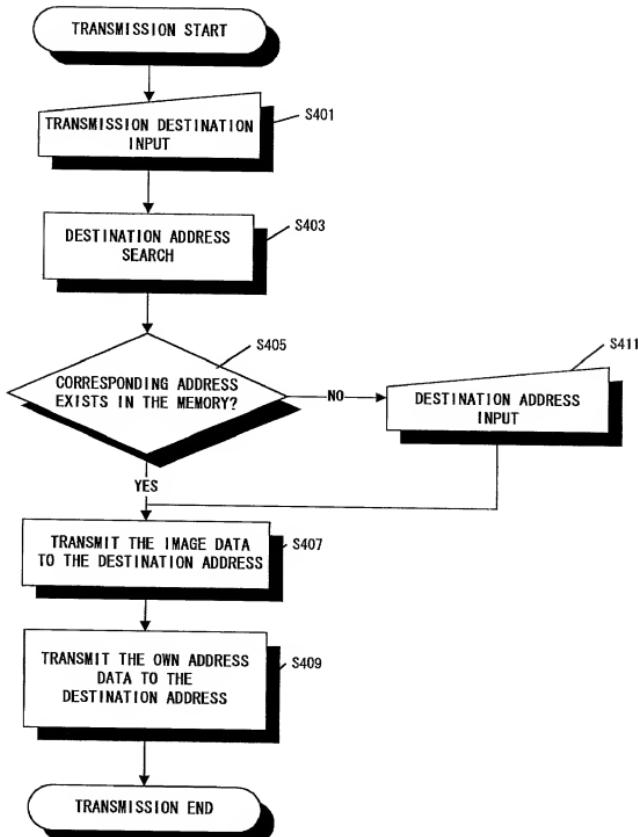


Fig.5

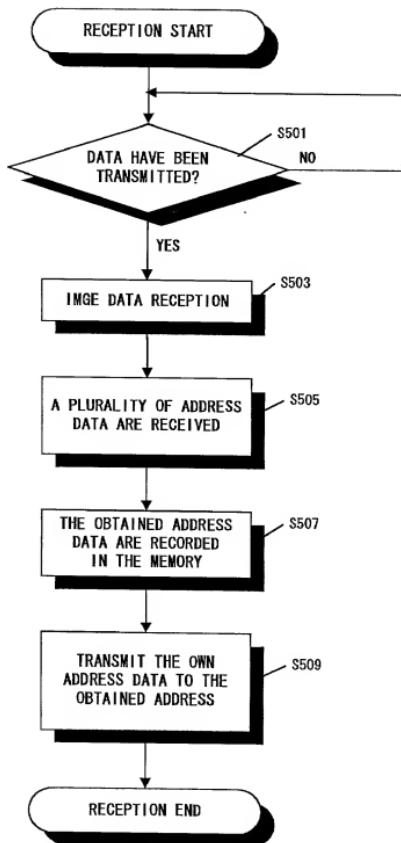


Fig.6

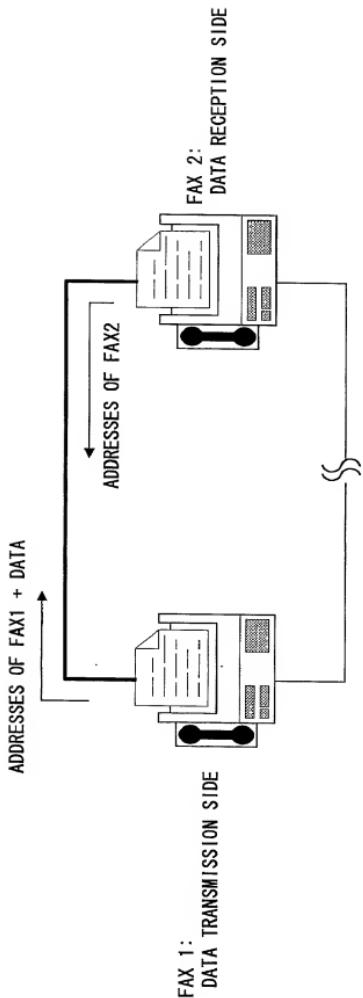
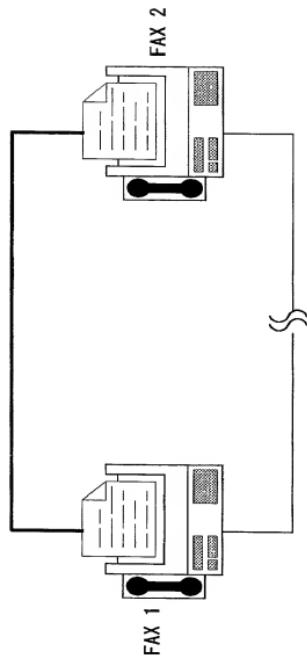


Fig. 7



ADDRESSES RECORDED IN THE MEMORY OF FAX1

FAX2	XXX-XXX-BBBB	fax2.bar.yy.aaa

ADDRESSES RECORDED IN THE MEMORY OF FAX2

FAX1	XXX-XXX-AAAA	fax1.foo.xx.zzz

Fig.8

Public Telephone Line

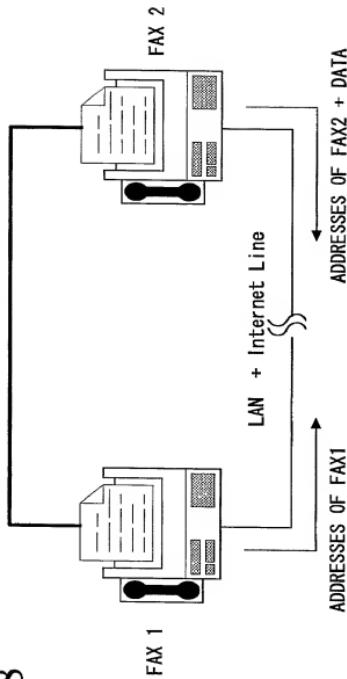


Fig.9

Public Telephone Line

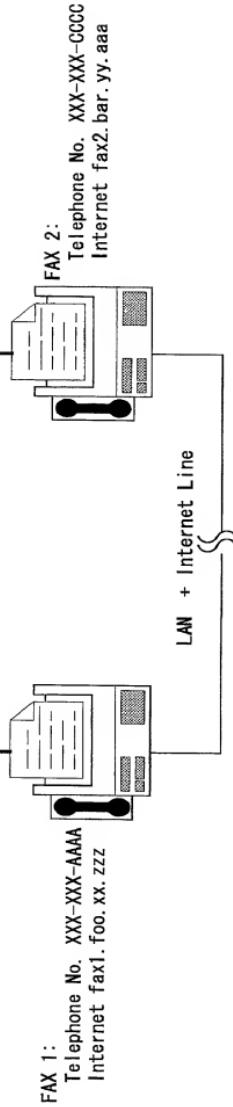
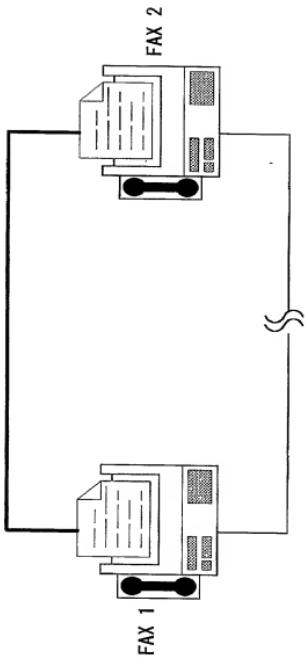


Fig.10



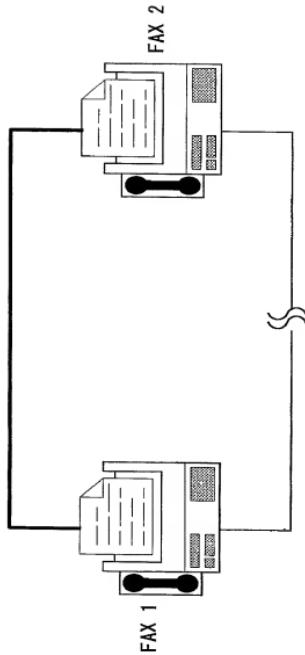
ADDRESSES RECORDED IN THE MEMORY OF FAX1

FAX2	XXX-XXX-CCCC	fax2.bar.yy.aaa

ADDRESSES RECORDED IN THE MEMORY OF FAX2

FAX1	XXX-XXX-AAAA	fax1.foo.xx.zzzz

Fig.11



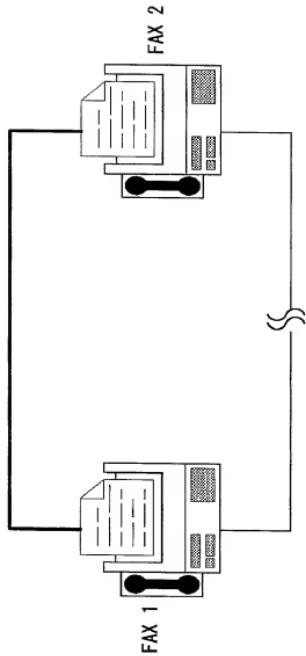
ADDRESSES RECORDED IN THE MEMORY OF FAX1

FAX2	XXX-XXX-BBBB	fax2.bar.yy.aaa
FAX2 [NOT PERMITTED]	XXX-XXX-CCCC	fax2.bar.yy.aaa

ADDRESSES RECORDED IN THE MEMORY OF FAX2

FAX1	XXX-XXX-AAAA	fax1.foo.xx.zzzz

Fig.12



(DELETE) ADDRESSES RECORDED IN THE MEMORY OF FAX1

FAX1	XXX-XXX-BBBB	fax2.bar.yy.aaa
FAX2	XXX-XXX-CCCC	fax2.bar.yy.aaa

ADDRESSES RECORDED IN THE MEMORY OF FAX2

FAX1	XXX-XXX-AAAA	fax1.foo.xx.zzzz

Attorney Docket No.

DECLARATION AND POWER OF ATTORNEY

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe that I and the other joint inventors named below are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention or discovery entitled

DATA COMMUNICATION APPARATUS AND METHOD OF DATA COMMUNICATION

the specification of which

(check one) is attached hereto.

____ was filed on _____, _____ as
Application Ser. No. _____.

I have reviewed and understand the contents of the above-identified specification, including the claims; and

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me which is material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application for patent or inventor's certificate as listed below or of any PCT international application, designating at least one country other than the United States of America, as listed below and have also identified below any foreign application for patent or inventor's certificate or any PCT international application, designating at least one country other than the United States of America, directed to said invention or discovery and having

a filing date before that of the applications on which priority is claimed:

<u>NUMBER</u>	<u>COUNTRY</u>	<u>DATE FILED</u>	<u>PRIORITY CLAIMED</u>
			(Yes) (No)
11-223622	Japan	August 6, 1999	X

I hereby appoint:

Dale B. Nixon, Reg. No. 28,454
William R. Gustavson, Reg. No. 29,160
David L. Hitchcock, Reg. No. 30,067
Roger N. Chauza, Reg. No. 29,753
Eugenia S. Hansen, Reg. No. 31,966
James W. Williams, Reg. No. 20,047
Steven P. Rhines, Reg. No. 38,595
Thomas N. Tarnay, Reg. No. 41,341
Daren C. Davis, Reg. No. 38,425

all of the firm of SIDLEY & AUSTIN, my representatives with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities under the Patent Cooperation Treaty.

Send correspondence to:	Direct telephone calls to:
SIDLEY & AUSTIN	____ James W. Williams
717 N. Harwood	Direct: (214) 981-3328
Suite 3400	Main: (214) 981-3300
Dallas, Texas 75201-6507	Attorney Docket No.: _____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that

these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of first joint inventor:

Kenichi	Middle	MORITA
First		Last

Inventor's signature: Kenichi Morita

Date: July 24, 2000

Residence: Toyohashi-Shi, Aichi-Ken, Japan

Citizenship: Japanese

Post Office Address: C/O MINOLTA CO., LTD., Osaka Kokusai
Bldg., 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka-Shi, Osaka
541-8556 Japan

Full name of second joint inventor:

Keisuke	Middle	HASHIMOTO
First		Last

Inventor's signature: Keisuke Hashimoto

Date: July 24, 2000

Residence: Toyokawa-Shi, Aichi-Ken, Japan

Citizenship: Japanese

Post Office Address: C/O MINOLTA CO., LTD., Osaka Kokusai
Bldg., 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka-Shi, Osaka
541-8556 Japan

Full name of third joint inventor:

First	Middle	Last
Kenichi		TAKAHASHI

Inventor's signature: Kenichi Takahashi

Date: July 24, 2000

Residence: Toyohashi-Shi, Aichi-Ken, Japan

Citizenship: Japanese

Post Office Address: C/O MINOLTA CO., LTD., Osaka Kokusai
Bldg., 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka-Shi, Osaka
541-8556 Japan

Full name of forth joint inventor:

First	Middle	Last
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Inventor's signature: _____

Date: _____

Residence: _____

Citizenship: Japanese

Post Office Address: C/O MINOLTA CO., LTD., Osaka Kokusai
Bldg., 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka-Shi, Osaka
541-8556 Japan

Full name of fifth joint inventor:

First	Middle	Last
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Inventor's signature: _____

Date: _____

Residence: _____

Citizenship: Japanese

Post Office Address: C/O MINOLTA CO., LTD., Osaka Kokusai
Bldg., 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka-Shi, Osaka
541-8556 Japan